Amendments to the Claims

This listing of claim will replace all prior versions and listings of claim in the application.

1. An electrical connector comprising a plurality of bus conductors, each bus conductor of the plurality of bus conductors running through the length of the connector [yet] and being electrically isolated from [one another and] other bus conductors of the plurality of bus conductors, each bus conductor of the plurality of bus conductors having a number of compliant contact regions [disposed at various positions along their respective lengths so as] to provide electrical coupling points for like contact regions of electrical devices to be received within the connector, the plurality of bus conductors including [being divided into] first and second groups such that across the width of the connector, [a] each bus conductor of the first group is positioned [adjacent to] in an interleaved configuration with each bus conductor [conductors] of the second group [that is positioned adjacent to yet another bus conductor of the first group, and so on for each of the plurality of bus conductors, the] and having a predetermined transmission line impedance [of any pair of adjacent bus conductors, one being chosen from the first group and the other being chosen from the second group, being determinable], and wherein each of the bus conductors of the first group are adapted to be electrically coupled to respective signal paths associated with a circuit board on which the connector is to be mounted through [only two] an electrical contact element [elements regardless of the number of compliant contact regions, the two electrical contact elements of each bus conductor of the first group being arranged so that each is] disposed substantially near [an] each end of [its] each respective bus conductor of the first group, and the bus conductors of the second group each being adapted to be electrically coupled to an electrical ground plane associated with the circuit board through a number of electrical contact elements disposed along each bus conductor of the second group [their respective lengths, the number of electrical contact elements being irrespective of the number of compliant contact regions].

2. A connector as in claim 1 wherein a dielectric spacer is disposed between each adjacent bus conductor of the first and second groups.

3. A connector as in claim 2 wherein said compliant contact regions of said bus conductors comprise fingers offset from respective ones of said bus conductors through a bend.

4. A connector as in claim 2 wherein said compliant contact regions comprise elastomer-backed metal regions.

5. A connector as in claim 1 wherein said compliant contact regions of said bus conductors are made of a Beryllium-Copper (Be--Cu) alloy.

6. A connector as in claim 5 further comprising a dielectric spacer disposed between each adjacent bus conductor of the first and second groups.

7. A connector as in claim 1 wherein said compliant contact regions of said bus conductors comprise elastomer-backed metal regions.

8. A connector as in claim 1 wherein the compliant contact regions of bus conductors of the first group are arranged to contact a first side of the electrical devices and the compliant contact regions of bus conductors of the second group are arranged to contact a second side of the electrical devices.

9. A connector as in claim 8 wherein the compliant contact regions of the bus conductors are made of a Beryllium-Copper (Be--Cu) alloy.

10. A connector as in claim 8 wherein the compliant contact regions of the bus conductors comprise elastomer-backed metal regions.

11. A connector as in claim 8 wherein the compliant contact regions of the bus conductors comprise fingers offset from respective ones of the bus conductors through a bend.

12. A connector as in claim 1 wherein the signal paths comprise a plurality of traces on the circuit board.

13. A connector as in claim 12 wherein the compliant contact regions of the bus conductors comprise fingers offset from respective ones of the conductors through a bend.

14. A connector as in claim 12 wherein the compliant contact regions of the bus conductors comprise elastomer-backed metal regions.

15. A connector as in claim 1 wherein said electrical contact elements of said bus conductors of the first group comprise metal posts.

16. A connector as in claim 15 wherein said electrical contact elements of said bus conductors of the second group comprise metal posts.

17. A connector as in claim 16 wherein said metal posts of said bus conductors of the second group are disposed at approximately equal intervals over the lengths of each of said bus conductors of said second group.

18. A socket for providing an electrical interface between a substrate and a plurality of removable electronic components, the socket comprising:

a socket housing adapted to receive the plurality of removable electronic components; and

a first group of conductor lines interleaved with a second group of conductor lines, wherein the first group of conductor lines includes a first signal conductor extending through the socket housing and having a predetermined impedance and first and second ends adapted to couple respectively to first and second traces disposed on the substrate such that the first signal conductor forms a signal transmission line between the first and second traces, the first signal conductor further having a plurality of electrical contact regions to couple to counterpart electrical contact regions disposed on the plurality of removable electronic components, and wherein the second group of conductor lines includes a number of electrical contact elements disposed along the length of each conductor line of the second group of conductor lines, the number of electrical contact elements being adapted to couple to a ground plane node of the substrate.

19. The socket of claim 18 wherein additional signal conductors of the first group of conductor lines extend through the socket housing parallel to the first signal conductor, the additional signal conductors each having the predetermined impedance and first and second ends adapted to couple to a respective additional pair of traces on the substrate such that each of the additional signal conductors form a signal transmission line between the additional pair of traces, each of the additional signal conductors further having a plurality of electrical contact regions to couple to additional counterpart electrical contact regions disposed on the plurality of removable electronic components, the first signal conductor and the additional signal conductors forming a signaling bus that extends through the socket housing.

20. The socket of claim 18 wherein the second group of conductor lines includes a first ground conductor extending through the socket housing and disposed adjacent the first signal conductor, the first ground conductor having a plurality of contact elements disposed along its length to couple the first ground conductor to the ground plane of the substrate.

21. The socket of claim 20 wherein the first group of conductor lines include:

additional signal conductors extending through the socket housing in a direction parallel to the first signal conductor, the additional signal conductors each having the predetermined impedance and first and second ends adapted to couple to a respective additional pair of traces on the substrate such that each of the additional signal conductors form a signal transmission line between the respective additional pair of traces, each of the additional signal conductors further having a plurality of electrical contact regions to couple respectively to additional counterpart electrical contact regions disposed on the plurality of removable electronic components, the first signal conductor and the additional signal conductors forming a signaling bus that extends through the socket housing;

wherein the second group of conductor lines include additional ground conductors extending through the socket housing parallel to the first ground conductor, each of the additional ground conductors having a plurality of contact elements located along its length to couple to a ground plane of the substrate; and

wherein signal conductors, including the first signal conductor and the additional signal conductors, and ground conductors, including the first ground conductor and the additional ground conductors, are disposed within the socket housing such that each of the signal conductors is adjacent a respective one of the ground conductors.

22. The socket of claim 21 wherein each one of the signal conductors is disposed adjacent another one of the signal conductors.

23. The socket of claim 21 wherein the signal conductors and the ground conductors are disposed within the socket housing such that each signal conductor of a subset of the signal conductors is positioned between a respective pair of the ground conductors.

24. The socket of claim 21 wherein the signal conductors and ground conductors are disposed within the socket housing such that the contact regions of each signal conductor oppose the contact regions of the adjacent ground conductor.

25. The socket of claim 21 wherein each signal conductor and adjacent ground conductor form a signal-ground conductor pair having opposing signal and ground contact regions, each pair of opposing signal and ground contact regions being positioned to contact respective electrical contact elements disposed on opposing faces of a respective one of the removable electronic components.

26. The socket of claim 25 wherein the contact regions of the signal conductors of the signal-ground conductor pairs are positioned to alternately contact each of the opposing faces of the respective one of the removable electronic components.

27. The socket of claim 26 wherein the contact regions of the ground conductors of the signal-ground conductor pairs are positioned to alternately contact each of the opposing faces of the respective one of the removable electronic components.

28. The socket of claim 20 further comprising a dielectric spacer disposed between the first signal conductor and the first ground conductor.

29. The socket of claim 28 wherein the width of the dielectric spacer is selected to achieve the predetermined impedance of the first signal conductor.

30. The socket of claim 28 wherein the dielectric spacer is bonded to at least one of the first ground conductor and the first signal conductor.

31. The socket of claim 20 wherein the first signal conductor and the first ground conductor are formed by respective conductive plates.

32. The socket of claim 18 further comprising an elastomer disposed underneath each of the plurality of electrical contact regions of the first signal conductor.

33. The socket of claim 18 wherein additional signal conductors of the first group of conductor lines extend through the socket housing parallel to the first signal conductor, the additional signal conductors each having the predetermined impedance and first and second ends adapted to couple to a respective additional pair of traces on the substrate such that each additional signal conductor forms a signal transmission line between the additional pair of traces, each additional signal conductor further having a plurality of electrical contact regions to couple to additional counterpart electrical contact regions on the plurality of removable electronic components; and wherein the socket further comprises a plurality of elastomers extending through the socket housing in a direction transverse to the first signal conductor and the additional signal conductors, each of the elastomers extending beneath at least one electrical contact region of each of the additional signal conductors and beneath at least one electrical contact region of the first signal conductor.

34. The socket of claim 33 wherein each of the elastomers of the plurality of elastomers is formed from a dielectric material to maintain electrical isolation between the signal conductors, including the first signal conductor and the additional signal conductors.

35. - 36. (canceled)

37. The socket of claim 18 wherein each of the removable electronic components is a daughter card and the socket housing is adapted to receive a plurality of the daughter cards.

38. The socket of claim 18 wherein each of the removable electronic components is an integrated circuit device and the socket housing is adapted to receive a plurality of the integrated circuit devices.

39. The socket of claim 18 wherein the first and second ends of the first signal conductor include posts adapted to fit into respective holes in the substrate.

40. An electrical connector comprising:

a connector housing having a plurality of slots to receive removable electronic components;

signal conductors that extend through the connector housing to form a signaling bus, the signal conductors including contact regions to electrically couple the removable electronic components to the signaling bus, each of the signal conductors having first and second ends to couple to respective signal traces on a substrate and having a predetermined impedance; and

ground conductors that extend through the connector housing parallel to and interleaved with the signal conductors, the ground conductors each including a plurality of contact regions to electrically couple to a ground reference of the substrate, the ground conductors and signal conductors being disposed within the connector housing such that each of the signal conductors is adjacent at least one of the ground conductors.

41. - 42. (canceled)

43. The electrical connector of claim 40 wherein a dielectric spacer is positioned between each signaling conductor and adjacent ground conductor.

44. The electrical connector of claim 40 wherein each of the signal conductors forms a transmission line between the respective signal traces when coupled thereto.

45. The electrical connector of claim 40 wherein each of the signal conductors is adapted to be coupled to the substrate only at the first and second ends, and wherein each of the ground conductors includes at least three contact regions to couple to the ground reference of the substrate.

46. The electrical connector of claim 40 wherein the contact regions of the signal conductors and the contact regions of the ground conductors each extend into the slots of the connector housing to contact counterpart contact regions of the removable electronic components when the removable electronic components are inserted into the slots of the connector housing.

47. A signaling system comprising:

a substrate including a first plurality of signal conducting traces and a second plurality of signal conducting traces;

a socket mounted to the substrate and including a housing with slots formed therein, the socket further including a plurality of signal conductors that extend through the housing in a direction transverse to the slots, each signal conductor of the plurality of signal conductors having a predetermined impedance and being coupled to form a transmission line between a respective one of the first plurality of signal conducting traces on the substrate and a respective one of the second plurality of signal conducting traces on the substrate, and wherein the plurality of signal conductors include a group of signaling lines that are interleaved with a group of ground lines, each ground line of the group of ground lines including a plurality of electrical contact elements electrically coupled to a ground plane; and

a plurality of electronic components removably inserted into the slots of the socket housing, each of the electronic components including a plurality of contact regions that respectively contact the plurality of signal conductors.

48. The signaling system of claim 47 wherein each of the plurality of electronic components comprises a printed circuit board having an integrated circuit device mounted thereon.

49. The signaling system of claim 48 wherein the integrated circuit device is a semiconductor memory device.

50. The signaling system of claim 49 wherein the semiconductor memory device is a dynamic random access memory device.

51. The signaling system of claim 49 further comprising a memory controller mounted to the substrate and coupled to the first plurality of signal conducting traces, the memory controller being adapted to transmit signals to the semiconductor memory device via the first plurality of signal conducting traces.

52. The signaling system of claim 47 wherein each of the electronic components comprises an integrated circuit device.

53. The signaling system of claim 52 wherein the integrated circuit device is a semiconductor memory device.

54. The signaling system of claim 53 wherein the semiconductor memory device is a dynamic random access memory device.

55. The signaling system of claim 53 further comprising a memory controller mounted to the substrate and coupled to the first plurality of signal conducting traces, the memory controller being adapted to transmit signals to the semiconductor memory device via the first plurality of signal conducting traces.

56. The signaling system of claim 47 further comprising a plurality of termination elements coupled respectively to the second plurality of signal conducting traces.

57. (canceled)

58. The signaling system of claim 47 wherein each ground line of the group of ground lines includes a plurality of contact regions to contact the plurality of electronic components.

59. The signaling system of claim 58 wherein each ground line of the group of ground lines is disposed within the housing adjacent at least one of the signaling lines of the group of signaling lines, each ground line of the group of ground lines and each signaling line of the group of signaling lines forming a plurality of signal-ground conductor pairs.

60. The signaling system of claim 59 wherein each of the signal-ground conductor pairs contacts a first electrical component of the plurality of electrical components on opposing faces of the first electrical component.

61. The signaling system of claim 60 wherein each of the signal-ground conductor pairs are disposed within the socket housing such that the plurality of signal conductors alternately contact a first face and a second face of the opposing faces of the first component.

62. The signaling system of claim 61 wherein each of the signal-ground conductor pairs are disposed within the socket housing such that the plurality of ground conductors alternately contact the first face and the second face of the opposing faces of the first component.